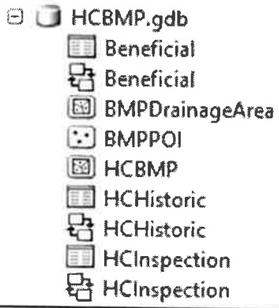
Appendix C3 – Source Identification (Stormwater Management)

BMP Geodatabase – DRAFT Schema 17 December 2018



Beneficial-RelatedTable One entry to many HCBMP		
Attribute	Description	Source
TaxID	The tax id of the parcels responsible for maintenance on the BMP.	SDAT/Parcel
Share	The percent of the BMP maintenance assigned to each beneficial user.	EnerGov
BMPid	A unique ID assigned from the GIS Information	GIS Information
TaxIDLink	The link to the Maryland Department of Assessments & Taxation (SDAT) website in relation to the TaxID number.	

HCInspection-RelatedTable One entry to many HCBMP		
Attribute	Description	Source
BMPid	A unique ID assigned from the GIS Information	GIS Information
Inspect Date	The date of the BMP Inspection.	
InspectRating	A score of 1-4 based on Harford County's inspection standards.	
Inspector	The lead inspector's name.	EnerGov
Type	The BMP Practice based on the MDE Guidance May 2017.	
Notes	Any extra information about the BMP.	GIS Information
InspectionLink	A link to the inspection in association to the inspection date and BMP.	EnerGov

HCHistoric-RelatedTable One entry to many HCBMP		
Attribute	Description	Source
BMPid	A unique ID assigned from the GIS Information.	GIS Information
Name	The title of the original as-built.	Original As-Built
AsBuiltLink	A link to the As-Built associated to the BMP.	Laserfiche
Type	The BMP Practice based on the MDE Guidance May 2017.	GIS Information

BMPPOI		
Attribute	Description	Source
Copy of MS4 Geodatabase BMPPOI Feature Class		

BMPDrainageArea		
Attribute	Description	Source
Copy of MS4 Geodatabase BMPDrainageArea Feature Class		

HCBMP– Geometry Polygon		
Attribute	Description	Source
PermitNo		EnerGov
Permitapproval	The date Harford County approved the permit.	
AsBuiltLink	A link to the As-Built associated to the BMP.	Laserfiche
BMPasbuilt	The As-Built completion/acceptance by county/date on plan?	
ApprovedPlanLink	A link to the Harford County approved plans.	
PlanApproval	The date Harford County approved the plans.	
CompLink	The link to computations associated to the BMP.	
ProjectNo	The county's billing number in connection with the project	As-built
BMPname	The name on the As-Builts	GIS Information
BMPid	A unique ID assigned from the GIS Information	
BMPtype	The BMP practice's name in accordance with the MDE Guidance May2017	
BMPPOI_ID	From the MS4 Geodatabase. Connects the BMP to the POI and BMPDrainageArea	
YearConstructed	The Year the BMP was constructed	Original As-built
BMPaddress	Combination of the site name and site address.	GIS Information
BMPcity	City BMP is located in.	
BMPzip	Zip BMP is located in.	
BMPComments	Any comments related to the BMP	
Propertytype	The type of property the BMP resides on.	EnerGov
ManageCoID	Management Companies County generated ID	
Ownership	The party responsible for maintaining the BMP. Domain Values: • HOA • Beneficial Users, No HOA	
Ownername	The name of the HOA agent, if HOA.	
Owneraddress	The street address of the HOA agent, if HOA.	
Ownercity	The city of the HOA agent, if HOA.	
Ownerstate	The state of the HOA agent, if HOA.	
Ownerzip	The zip code of the HOA agent, if HOA.	
TaxID	The TaxID number of the parcel the BMP resides on.	SDAT/Parcel Data
TaxIDLink	The link to the Maryland Department of Assessments & Taxation (SDAT) website in relation to the TaxID number.	
MaintenanceAgreement	The link to the signed maintenance agreement between HOA or beneficial.	Laserfiche

Harford County – BMP Database Data Dictionary
12/17/2018

HCBMP- Polygon Geometry – footprint of the environmental site design (ESD) treatment systems and structural stormwater management practices. Footprint are delineated from the As-built plans.

Attribute	ESRI Data Type	Description/Notes	Source
OBJECTID	ObjectID	ArcGIS Default Unique ID Field	ESRI
PermitNo	Text (100)	Stormwater management permit number	EnerGov
Permitapproval	Date	The date the County approved the permit.	EnerGov
AsBuiltLink	Text (255)	A link to the As-Built plan.	Laserfiche
BMPasbuilt	Date	The As-Built completion acceptance date by county?	AS-Built
ApprovedPlanLink	Text (255)	A link to the Harford County approved plans.	Laserfiche
PlanApproval	Date	The date Harford County approved the plans.	Approved Plan
CompLink	Text (255)	The link to computations.	Laserfiche
ProjectNo	Double	The county's billing number in relation to the project	?
BMPname	Text (100)	The name on the As-Builts	As-built
BMPid	Text (25)	A unique ID assigned from the GIS Information	GIS Information
BMPtype	Domain	The BMP practice's name in accordance with the MDE Guidance May2017	MDE Guidance May 2017
BMPPOI_ID	Text (13)	From the MS4 Geodatabase. Connects the BMP to the POI and BMPDrainageArea	GIS Information
YearConstructed	Double	The Year the BMP was constructed	Original As-built Or Aerials
BMPaddress	Text (50)	Combination of the site name and site address.	GIS Information
BMPcity	Text (50)	City BMP is located in.	GIS Information
BMPzip	Text (20)	Zip BMP is located in.	GIS Information

Attribute	ESRI Data Type	Description/Notes	Source
BMPcomments	Text (255)	Any comments related to the BMP	GIS Information
Propertytype	Text (255)	The type of property the BMP resides on.	EnerGov
ManageCo	Domain	Management Companies.	EnerGov
Ownership	Domain	The party responsible for maintaining the BMP. **Domain Values:** • HOA • Beneficial Users, No HOA	EnerGov
Ownername	Text (50)	The name of the HOA, if HOA.	EnerGov
Owneraddress	Text (50)	The street address of the HOA agent, if HOA.	EnerGov
Ownercity	Text (50)	The city of the HOA agent, if HOA.	EnerGov
Ownerstate	Text (2)	The state of the HOA agent, if HOA.	EnerGov
Ownerzip	Text (20)	The zip code of the HOA agent, if HOA.	EnerGov
TaxID	Text (25)	The TaxID number of the parcel the BMP is located.	SDAT/Parcel Data
TaxIDLink	Text (255)	The link to the Maryland Department of Assessments & Taxation (SDAT) website based on the parcels' s TaxID number.	SDAT/Parcel Data
MaintenanceAgreement	Text (255)	The link to the signed maintenance agreement between HOA or beneficial.	Laserfiche
Shape_Area	Double	ArcGIS System's Default Field	ESRI
Shape_Length	Double	ArcGIS System's Default Field	ESRI

Beneficial-Table – Table of the properties that drainage to the BMP and are responsible for some percentage/share of BMP maintenance.

Attribute	ESRI Data Type	Description/Notes	Source
ObjectID	ObjectID	ArcGIS Default Unique ID Field	ESRI
TaxID	Text (50)	The tax id of the parcels responsible for maintenance on the BMP.	SDAT/Parcel Data
Share	Text (50)	The percent of the BMP maintenance assigned to each beneficial user	EnerGov
Bmpid	Text (25)	A unique ID assigned from the GIS Information	GIS Information
TaxIDLink	Text (255)	The link to the Maryland Department of Assessments & Taxation (SDAT) website based on the parcels' s TaxID number.	SDAT/Parcel Data

HCInspection-Table – Table recording inspections results from the Bureau of Stormwater Management Construction Inspection Staff

Attribute	ESRI Data Type	Description/Notes	Source
ObjectID	ObjectID	ArcGIS Default Unique ID Field	ESRI
BMPid	Text (25)	A unique ID assigned from the GIS Information	GIS Information
Inspect Date	Date	The date of the BMP Inspection.	EnerGov
InspectRating	Double	A score of 1-4 based on Harford County's inspection standards.	EnerGov
Inspector	Text (25)	The lead inspector's name.	EnerGov
Type	Text (15)	The BMP Practice based on the MDE Guidance May 2017.	GIS Information

Notes	Text (255)	Any extra information about the BMP.	GIS Information
InspectionLink	Text (255)	A link to the inspection in association to the inspection date and BMP.	EnerGov

HC Historic-Table – Table to record original BMP data, used for tracking when BMP has been retrofitted.

Attribute	ESRI Data Type	Description/Notes	Source
ObjectID	ObjectID	ArcGIS Default Unique ID Field	ESRI
BMPid	Text (25)	A unique ID assigned from the GIS Information.	GIS Information
Name	Text (100)	The title of the original As-built.	Original As-Builts
AsBuiltLink	Text (255)	A link to the As-Built associated to the BMP.	Laserfiche
Type	Text (50)	The BMP Practice based on the MDE Guidance May 2017.	GIS Information

Cityworks Implementation Technical Memorandum

Prepared for

Harford County Department of Public Works
Division of Construction Management
Watershed Protection and Restoration Office
212 S. Bond Street
Bel Air, MD 21014

Prepared by

EA Engineering, Science, and Technology, Inc., PBC
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September 2018
Version: FINAL
EA Project No. 1535705

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Table of Contents

List of Figures

Page

List of Tables

Page

Cityworks Implementation Technical Memorandum

1. Introduction and Background

Harford County's (County) National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit (Permit Number 11-DP-3310, effective 30 December 2014 through 29 December 2019), requires the County to conduct preventative maintenance inspections of all environmental site design (ESD) treatment systems and structural stormwater management practices on a triennial basis.

The County is required to report annually to the Maryland Department of Environment (MDE) documentation identifying the stormwater management practices inspected, the number of maintenance inspections, the number of follow-up inspections, the enforcement actions used to ensure compliance, and the maintenance inspection schedule.

Harford County's Department of Public Works, Watershed Protection and Restoration Office (MS4 Office) has expressed an interested in exploring the use of Cityworks to manage the stormwater management triennial maintenance inspections.

Cityworks is a computerized maintenance management system created by Azteca Systems, LLC (Azteca). The County's Division of Water and Sewer (Water and Sewer) have been successfully using Cityworks to manage their existing infrastructure for several years. Most recently, Water and Sewer have expanded their assets management to include their buildings. Cityworks is a GIS-centric maintenance management solution that enables the end-user to access GIS data to assist in identifying and managing assets. While it is not required for Cityworks to access GIS data, Cityworks' ability to consume GIS data is one of the software's advantages.

As part of the MS4 annual report requirements, the County is required to populate and submit a geodatabase in compliance with the *Maryland Department of the Environment, National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4), Geodatabase Design and User's Guide* (May 2017). This geodatabase is referred to the as the MDE MS4 geodatabase in this document. The data in the MDE MS4 geodatabase is used to assist MDE in calculating the Total Maximum Daily Load (TMDL) reductions to the Chesapeake Bay.

The MDE MS4 geodatabase is not set up to assist in operations/management of stormwater management infrastructure. The County is interested in extracting the inspection data from Cityworks to populate the MDE MS4 geodatabase. This will assist in streamlining annual reporting requirements while providing more efficient management of stormwater management assets.

1.1 Purpose

The MS4 Office contracted EA Engineering, Science, and Technology Inc., PBC. (EA) to assist in planning and identifying recommendations for the implementation of Cityworks, to document stormwater management triennial maintenance inspections workflows, and to streamline the associated reporting to MDE. The information presented in this Technical Memorandum was

gathered through a series of meetings with various stakeholders including the MS4 Office, the Bureau of Construction Inspections, the Bureau of Stormwater Management, the Division of Water and Sewer, and the Office of Information and Communications Technology (OICT). Additional information was included by staff from the MS4 Office to provide clarity around the MS4 requirements and County procedures.

The purpose of this Technical Memorandum is to:

1) Document the County's current stormwater management inspection procedures and identify any procedural matters needing to be further explored prior to Cityworks implementation

2) Document the County's current stormwater management GIS database management and identify configuration/data manipulation needed prior to Cityworks implementation

3) Review and document the County's current Cityworks platform environment maintained by the County's OICT.

2. Current County Stormwater Management Inspection Workflow

2.1 Division of Construction Management Inspection Bureaus

Stormwater management inspections are completed by two separate bureaus within the Department of Public Works, Division of Construction Management (Table 1). The Bureau of Construction Inspections completes stormwater management inspections for construction and one-year post construction, as applicable. The Bureau of Stormwater Management completes stormwater management triennial maintenance inspections.

Table 1: Stormwater Management Inspection Responsibilities

	Bureau of Construction Inspections	Bureau of Stormwater Management
Purpose	Inspections during construction and one-year post construction inspection, as applicable	Triennial maintenance inspections
Tracking	EnerGov	EnerGov currently; investigating switch to Cityworks
Employees	Mike Davies	Mike Rist Christy Joyce

The MS4 Office specifically contracted EA to focus this Technical Memorandum on the Bureau of Stormwater Management and the stormwater management triennial maintenance inspections.

2.2 Current Inspection Procedures

2.2.1 Permitting and Inspection Software

In 2015, Harford County began using EnerGov to manage all County permits for development and redevelopment. EnerGov is Tyler Technologies' software solution for permit tracking. The County did not purchase the asset management module of EnerGov.

The Bureau of Construction Inspections uses EnerGov to complete erosion and sediment control inspections and stormwater management inspections for projects under construction. After the Bureau of Construction Inspections completes the final inspection, stormwater management practices are released to the Bureau of Stormwater Management to complete triennial maintenance inspections.

The triennial maintenance inspections are currently stored in EnerGov. Only designated users with an EnerGov license are able to access triennial maintenance inspection reports. At this time, OICT has instructed that these reports remain only in EnerGov and not exported to Laserfische. Laserfische is a document management system currently used by the County for document archives. OICT's mandate is based on the consumption of server space. Availability of the triennial maintenance inspection reports within Laserfische would allow open access both internally to all County staff and externally to property owners and design engineers. The triennial maintenance inspection reports could be linked through the GIS and accessed through an ArcGIS Online application. The availability of past triennial maintenance inspections could be incorporated into Cityworks for remote access by the inspector.

The MS4 Office is proposing no changes to the inspections completed by the Bureau of Construction Inspections. EnerGov is providing adequate tracking for projects under construction. However, without the asset management module for EnterGov, managing the post-construction maintenance inspections is cumbersome and ineffective. Therefore, the MS4 Office has proposed investigating the use of Cityworks for managing the stormwater management assets post-construction including triennial maintenance inspections.

2.2.2 Inspection Workflow

The Bureau of Construction Inspections completes inspections for all stormwater management practices including active construction, as-built compliance, and one-year post-construction, as applicable.

There are two types of stormwater management plans: engineered plans and standard plans. Stormwater management projects designed under an engineered plan require a construction bond while a project is under construction. Upon approval of the stormwater management as-built plans, the construction bond is converted into a maintenance bond. One-year post-construction, the Bureau of Construction Inspections completes a final inspection and the bond is released. For projects designed under a standard plan, a construction bond is not required. The Bureau of Construction Management completes the final inspection for standard plans concurrently with the as-built compliance inspection.

Once the final inspection has been completed, the stormwater management asset is released to the Bureau of Stormwater Management to begin conducting triennial maintenance inspections.

A schematic of the stormwater management inspection workflow is included in Appendix D. The subsections below provides additional information for triennial maintenance inspections that could be not covered in the workflow schematic.

2.2.2.1 Inspection Reminders

Harford County Code requires corrective actions to be completed within 30 days of the owner receiving the inspection report. Inspectors understand that it takes longer for owners to contract services to address noncompliance and do not strictly enforce this requirement. The owner is responsible for notifying the inspector when corrective action has been completed for the inspector to return for a follow-up inspection.

Cityworks can be configured to set up reminders for all failed inspections after 90 days to assist the inspector in tracking follow-up inspections, should the owner fail to notify the County. This function will assist the Bureau of Stormwater Management with scheduling inspections.

2.2.2.2 Inspection Reporting for MS4 Compliance

The Bureau of Stormwater Management uses the same inspection form for the initial inspection and any follow-up inspections. The County is responsible for reporting the number of maintenance inspections, the follow-up inspections, the enforcement actions used to ensure compliance and the maintenance inspection schedule.

Cityworks can be configured to tie initial inspections and follow-up inspections together for more streamline tracking and reporting. Further discussion on how to set up the inspection procedures in Cityworks to meet MS4 permit requirements are needed.

2.2.2.3 Inspection Ratings

The Bureau of Stormwater Management uses a rating system of 0-4 for the severity of maintenance necessary for compliance. This rating system was developed by the County. The MDE MS4 geodatabase only requires documentation of triennial maintenance inspections as pass or fail. Facilities failing triennial maintenance inspections are removed from the County's inventory of data used to calculate reductions in pollutant loads for the Chesapeake Bay Model. Therefore, it is in the best interest for the County to properly document stormwater management practices with failing compliance and work towards efficiently and effectively obtaining compliance. Table 2 summarizes the rating system.

Table 2: Triennial Maintenance Inspection Rating System

Rating	Description	MS4 Compliance
0	**In Compliance** (no corrective action needed)	Pass
1	**Minor Maintenance Required** (grass needs to be mowed, fence needs to be replaced)	Pass
2	**Maintenance Required** (animal burrows in embankment, saplings on embankment needing to be removed)	Pass
3	**Equipment Corrective Action Required** (large trees to be removed from embankment, dredging needed, scouring that removed vegetation)	Fail
4	**Failed Inspection** (not functioning as designed because of failed spillway or large sediment load)	Fail

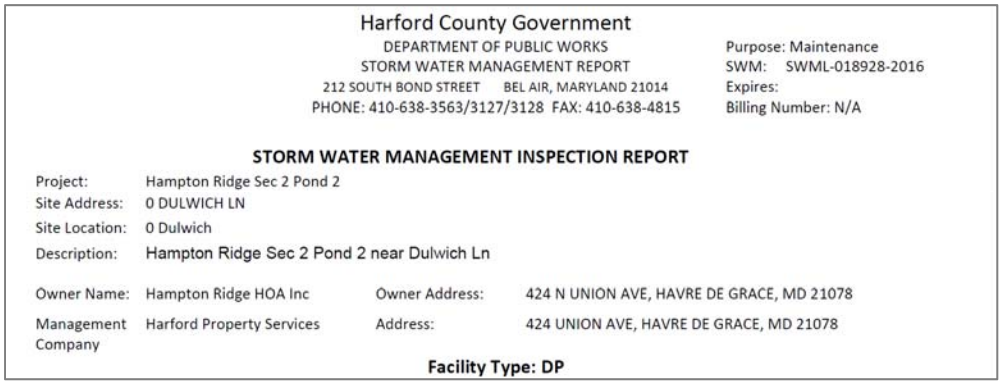
2.2.3 Inspection forms

The triennial maintenance inspection form is separated into three sections: the header, the body, and the conclusion. This form is initially created in EnerGov, exported to Microsoft Word, and further manipulated before finalizing and forwarding to the owners.

2.2.3.1 Inspection Form Header

All stormwater management inspection forms use the same header. Below are two examples from triennial maintenance inspections.

Figure 1: Triennial Maintenance Inspection Form Example 1



Harford County Government
DEPARTMENT OF PUBLIC WORKS
STORM WATER MANAGEMENT REPORT
212 SOUTH BOND STREET BEL AIR, MARYLAND 21014
PHONE: 410-638-3563/3127/3128 FAX: 410-638-4815

Purpose: Maintenance
SWM: SWML-018928-2016
Expires:
Billing Number: N/A

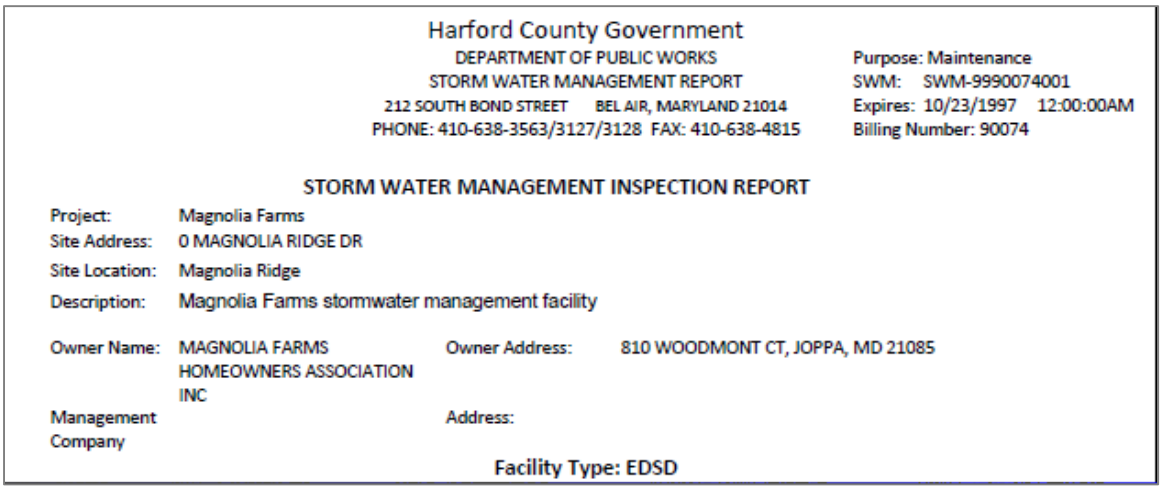
STORM WATER MANAGEMENT INSPECTION REPORT

Project: Hampton Ridge Sec 2 Pond 2
Site Address: 0 DULWICH LN
Site Location: 0 Dulwich
Description: Hampton Ridge Sec 2 Pond 2 near Dulwich Ln

Owner Name: Hampton Ridge HOA Inc
Owner Address: 424 N UNION AVE, HAVRE DE GRACE, MD 21078
Management Company: Harford Property Services
Address: 424 UNION AVE, HAVRE DE GRACE, MD 21078

Facility Type: DP

Figure 2: Triennial Maintenance Inspection Form Example 2



Harford County Government
DEPARTMENT OF PUBLIC WORKS
STORM WATER MANAGEMENT REPORT
212 SOUTH BOND STREET BEL AIR, MARYLAND 21014
PHONE: 410-638-3563/3127/3128 FAX: 410-638-4815

Purpose: Maintenance
SWM: SWM-9990074001
Expires: 10/23/1997 12:00:00AM
Billing Number: 90074

STORM WATER MANAGEMENT INSPECTION REPORT

Project: Magnolia Farms
Site Address: 0 MAGNOLIA RIDGE DR
Site Location: Magnolia Ridge
Description: Magnolia Farms stormwater management facility

Owner Name: MAGNOLIA FARMS HOMEOWNERS ASSOCIATION INC
Owner Address: 810 WOODMONT CT, JOPPA, MD 21085
Management Company
Address:

Facility Type: EDSD

Details on the fields from the header and their purposes are summarized in Table 3.

Table 3: Inspection Form Header Details

Field	Data Generated	Description
Purpose	Generated by EnerGov	All triennial maintenance inspections are identified as maintenance for both initial inspections and follow-up inspections
SWM	Generated by EnerGov	Stormwater management permit number – this number is formatted as the last two digits of the year the permit is issued plus the billing number plus an sequential number for each stormwater management practices. Example 2 above is 9990074001 – year built is 1999, billing number is 90074 and 001 is the one stormwater structure built on the site. If additional structures were built on the site, the next permit number would be 999074002. Example 1 above is SWML, a legacy stormwater management project constructed prior to the use of EnerGov. These permits do not follow the same naming style as described above. There may be other reasons to keep the permit number, but it is not required to be for MS4 reporting. This information is useful for C. Joyce to track down plans on the BMPs. This field may not be required if pdf plans are attached to the GIS.
Expires	Generated by EnerGov	Date the construction permit expires. Not required for triennial maintenance inspections.

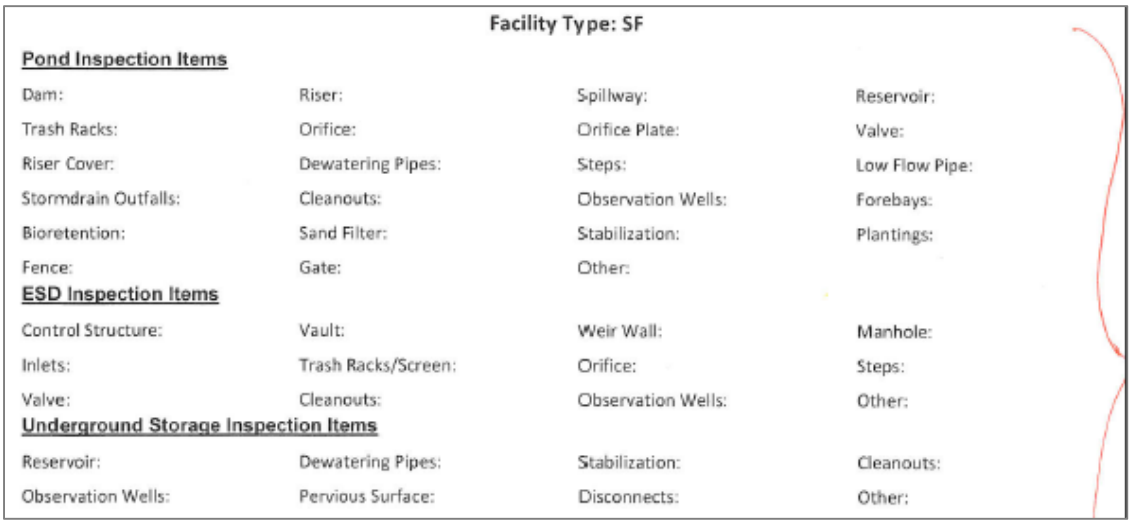
Field	Data Generated	Description
Project	Generated by EnerGov	Project name created by the developer. Required for triennial maintenance inspections and MS4 Reporting.
Site Address	Generated by EnerGov	Address for the parcel, linked to the Maryland State Department of Assessment and Taxation (SDAT). If the parcel is open space; it will not have a specific address.
Site Location	Entered by inspector	Description of where the stormwater management practice is located. Required for triennial maintenance inspections and MS4 Reporting.
Description	Entered by inspector	Entered for each inspection to describe the specific stormwater management practice being inspected under the permit. Required for triennial maintenance inspection. May be needed along with project field to fully describe the stormwater management practice.
Owner Name/Owner Address	Generated by EnerGov	Linked to SDAT. For open space, property information is rarely updated since the property is tax exempt. When owned by a homeowners association (HOA), the inspector may need to contact multiple residents to identify the HOA president. Required for triennial maintenance inspections.
Management Company/Address	Entered by inspector	Many HOAs hire management companies to manage maintenance. Required for triennial maintenance inspections.
Facility Type	Generated by EnerGov	Type of stormwater management practice. Required for triennial maintenance inspections and MS4 reporting.

EA has created a draft database schema for local stormwater management asset management for triennial maintenance inspections (Appendix C). The schema includes the fields from Table 3 necessary for both the triennial maintenance inspections and MS4 reporting. The establishment of this schema needs to be finalized in order to migrate the triennial maintenance inspections into Cityworks.

2.2.3.2 Inspection Form Body

The body of the inspection form was designed to remind the inspector of features to be inspected. Details in the body of the form are not typically populated by the inspector and are removed from the inspection report sent to the owner/management company. For Cityworks implementation, the detail provided in Figure 3 is not required.

Figure 3: Example 3 Inspection Body



Facility Type: SF

Pond Inspection Items

Dam:	Riser:	Spillway:	Reservoir:
Trash Racks:	Orifice:	Orifice Plate:	Valve:
Riser Cover:	Dewatering Pipes:	Steps:	Low Flow Pipe:
Stormdrain Outfalls:	Cleanouts:	Observation Wells:	Forebays:
Bioretention:	Sand Filter:	Stabilization:	Plantings:
Fence:	Gate:	Other:	

ESD Inspection Items

Control Structure:	Vault:	Weir Wall:	Manhole:
Inlets:	Trash Racks/Screen:	Orifice:	Steps:
Valve:	Cleanouts:	Observation Wells:	Other:

Underground Storage Inspection Items

Reservoir:	Dewatering Pipes:	Stabilization:	Cleanouts:
Observation Wells:	Pervious Surface:	Disconnects:	Other:

2.2.3.3 Inspection Form Conclusion

The Bureau of Stormwater Management removes the body of the inspection form and leaves just the Comment/Correction field and the Site Rating at the bottom (see Figure 4) when submitting a pdf of the inspection to the owner. Harford County Codes require inspectors to inform the owner what remediation is required. Inspectors generate very detailed conclusion/correction recommendations to meet this requirement. Inspectors include detailed written recommendations and photographs identifying the corrective action required for the BMPs to be in compliance. The inspector may also include marked-up As-Built and photographs from the inspection to assist the owner in knowing which BMP is being referred to (see Figure 5). The inspection report is then converted into a pdf and emailed to the owner.

Figure 4: Inspection Form Conclusion

Comments/Corrections

Vault boxes inspected:
#1 dry storage ok
#2 wet storage ok
#3 dry storage ok
#4 wet storage ok
All vault boxes are in compliance.

The facility is in accordance with Harford County's stormwater management regulations. The owner is required to inspect the facility at least twice a year and records should be kept by the owner. Please continue to perform the maintenance as required per Harford County Code.

Inspection Date: 06/09/2017 Reinspection Date: 06/09/2020 Mailed Emailed Site Rating: 0

Inspected Susan Cortese

An example of a completed inspection form is shown in Figure 5.

Figure 5: Completed Inspection Form

STORM WATER MANAGEMENT INSPECTION REPORT

Project: Magnolia Farms
Site Address: 0 MAGNOLIA RIDGE DR
Site Location: Magnolia Ridge
Description: Magnolia Farms stormwater management facility

Owner Name: MAGNOLIA FARMS HOMEOWNERS ASSOCIATION INC
Owner Address: 810 WOODMONT CT, JOPPA, MD 21085
Management Company
Address:

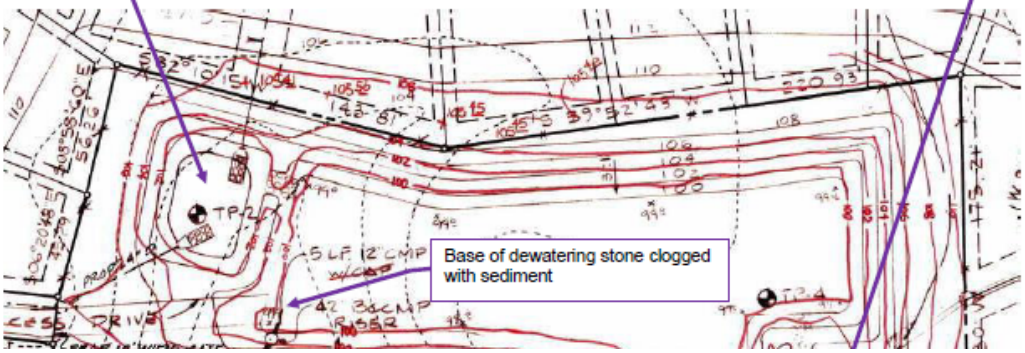
Facility Type: EDSD

Comments/Corrections

Forebay:
- The storm drain closest to the gate has a sediment load; approximate dimension 20'x15'x1'
- The storm drain farthest from the gate has a sediment load; approximate dimension 20'x15'x1.5'
- The spillway is severely eroded. There is significant sediment deposition at the base of the spillway from the eroded weir.

•Forebay:
- The entire bay is full of sediment accumulation; approximate dimension is 30'x20'x2'

•The spillway is channeling flow; stone is displaced.



Restore both forebays to plan specifications.
Remove vegetation from the fence.
Remove rocks from barrel's end section.
Rake the base of the dewatering stone to loosen sediment accumulation.
Monitor dam over the pipe for settlement.

It is requested that the described actions be performed within thirty days of this notification so as to bring this facility in compliance with Harford County's Stormwater Management regulations. Please contact our office at 410-638-3545, ext. 2435, or email at cjoyce@harfordcountymd.gov if there should be any questions and to schedule a re-inspection once the work has been completed.

Inspection Date: 01/29/2018 Re-inspection Date: 06/04/2018 Emailed Site Rating: 2

Inspected Christy Joyce Date: 3/10/2018


Gate in alignment


View of pond

2.3 Cityworks Implementation

Cityworks can be used to recreate a triennial maintenance inspection form and track triennial maintenance inspections for MS4 reporting. Cityworks has the ability to:

- Create a similar header
- Access GIS data to populate header fields
- Allow free-form text boxes for recording comments/corrective actions
- Attach photographs with captions during inspection
- Access electronic plans during inspection and capture plan markups and notations
- Set follow-up inspection reminders
- Set reminders for upcoming initial inspections
- View maps for pending inspections and prioritize scheduling

Recommendations for Next Steps:

- Document how a stormwater management project is initially entered into EnerGov.
- Document how the existing information from EnerGov can be exported into Cityworks including data fields and triennial inspection reports.
- Obtain guidance from MDE to quantify the level of maintenance needed to assess the practice as passing or failing. The MDE MS4 geodatabase only requires documentation of triennial maintenance inspections as pass or fail.
- Determine procedures for completing triennial maintenance inspections for ESD practices. The MDE MS4 geodatabase allows ESD practices to be grouped as a single feature and maintenance compliance reported as a single pass or fail for the system.
- Standardize fields for site name/project name, locations, and descriptions for consistency.
- Establish protocols for follow-up inspections and procedures for MS4 reporting.
- Consider using Cityworks to create work orders for County-owned stormwater management assets.

3. Current GIS Database Management

The MS4 Office currently maintains the GIS data for the stormwater management assets and is responsible for populating the MS4 MDE geodatabase. There are multiple GIS files in various stages of conformance with the MDE MS4 geodatabase. The GIS files are stored in personal geodatabases which allow the MS4 Office to use Microsoft Access to easily generate reports for the MS4 annual report. The GIS files are currently stored on the *\\hcghub\bigdata* server maintained by OICT.

The MDE MS4 geodatabase structure has been modified from previously required GIS submittals for MS4 reporting. MDE simplified ESD reporting by grouping similar structure types into a single GIS feature and reporting stormwater management practices in table format only, the BMP table. The spatial component for stormwater management practices is captured as a new feature called a point of interest, or POI. The POI is similar to the design point for stormwater management computations. Many of the design components particularly the level of water quality management is stored as attributes for the POI. The POI and the BMP table are linked together through an associated identification number.

The MS4 Office decided to continue to delineate each stormwater management practice. This was particularly necessary for graphically representing the stormwater management practice for triennial maintenance inspections. The inspector needs to be able to see on the map the practice to be inspected. Stormwater management practices were easily identifiable as point features many years ago when practices were generally very large ponds. As the practices have become smaller and more complex grouped systems, the MS4 Office recognized the need to delineate the practices as polygons. In 2015, the MS4 Office began delineating stormwater management practices as polygons and intends to convert the existing point features to polygon features. The spatial components for the various County GIS files is fairly complete (either as a point or a polygon).

However, the MS4 Office has been back and forth in determining the proper way to group ESD practices for local asset management. There is obvious benefit in grouping practices for reporting purposes, but some information cannot be captured for asset management such as ownership. Therefore, many of the attributes for the County GIS files are either incomplete or are complete but incorrectly assigned.

The MS4 Office has struggled with the applicability of the MDE MS4 geodatabase structure including its applicability for local asset management. The MDE MS4 geodatabase is structured with multiple relational features and tables connected through identification numbers. The process of creating a local geodatabase for asset management that is also capable of capturing information for the MDE MS4 geodatabase is extremely complex. Therefore, the County has been reluctant to fully implement their GIS into this format. As a result, the GIS data has been completed over the past several years in various degrees of completeness.

Table 4 summarizes the personal geodatabases used to store the stormwater management asset data based on the as-built years and the type of geometry for the spatial data.

Table 4: BMP GIS Database Storage

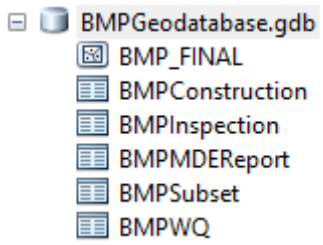
Geodatabase Name	Feature Class Name	Geometry Type	Notes on Data in Feature Class
stormwaterNEW.mdb	BMP_poly	Polygons	2017 completed by URS and reviewed by HC (66); Attributes in this feature class were selected from the Geodatabase Design and User Guide (May 2017). ESD of similar type are grouped together if they were constructed as part of larger development (i.e., dry wells for a new housing development).
Stormwater.mdb	New_BMP_2014	Points	Completed by URS, no review by HC. (1/2014 – 7/2015) - 207 features (19 may be duplicates in Facilities).
	Facilities	Points	Completed by HC - 1005 features Thru Dec 2000 (old regulations) – 381 Thru Dec 2010 (Design Manual) – 470 Thru Dec 2013 (ESD) – 135 Thru Jun 2015 (ESD) – 19

Appendix B includes a summary of the GIS files in Table 4, a review of the attributes, EA's draft description of the attribute, any actions or discrepancy in the data review, and the completeness of the attribute population.

3.1 Cityworks GIS Data Configuration

As discussed in Section 2 above, EA has created a draft database schema for local stormwater management asset management for triennial maintenance inspections (Appendix C). The schema includes the polygon feature, called BMP_Final and a series of related tables (Figure 6). The polygon feature would contain a majority of the fields required for triennial maintenance inspections. The related tables would include additional information such as construction completion date, amount of water quality managed, etc.

Figure 6: Geodatabase Format



In addition to stormwater management practices, the MS4 Office must also manage and inspect assets for restoration practices such as stream restorations and tree plantings. Within the MDE MS4 geodatabase, these practices are divided into various geometries and related tables based

on the type of restoration practice. For example, stream restorations are stored as lines features and tree plantings are stored as polygon features. The MS4 Office has decided locally to manage all of the restoration assets within a single GIS file as a polygon feature. For MS4 reporting, the restoration practices will need to be partitioned and batch processed into the MDE MS4 geodatabase schema. It may even be possible to incorporate the restoration practices within the local schema for the stormwater management assets as a single GIS file. More discussions and comparison of the various fields in the MDE MS4 geodatabase is needed.

Recommendations for Next Steps:

- Determine if restoration practices can be combined with the stormwater management assets into a single schema for local asset management.
- Finalize the database schema for local asset management.
- Create temporary polygons for stormwater management practices stored as points. The point features can be buffered to create polygons until the actual perimeter can be digitized from as-built plans.
- Migrate the existing GIS files into the local asset management geodatabase.

Explore the use of the spatial ETL tool from ESRI to transform data from the local geodatabase for asset management to the MDE MS4 geodatabase.

4. Cityworks Platform/Environment Specification

EA reviewed the following components of the Cityworks Platform/County Environment Specification:

- Existing Cityworks Software Licenses
- County-Maintained Cityworks Server Environment
- Water and Sewer Cityworks Configuration
- County-Maintained ESRI Software and Server Environment.

4.1 Existing Cityworks Software Licenses

Since 2011, Water and Sewer has been using Cityworks to manage their utility assets. Water and Sewer currently operates on Cityworks Server AMS 15.1 Service Pack 4 Platform 4.1 with a license agreement for 500 users. Approximately half of the 170 Water and Sewer employees use Cityworks daily. Approximately 10 employees between the MS4 Office and Bureau of Stormwater Management would require access to use Cityworks for triennial maintenance inspections. There is sufficient capacity within the existing license agreement to implement triennial maintenance inspections in Cityworks.

The following licensed products are part of the current license agreement:

- AMS Edits+ (Standards)
- CCTV Interface
- Paver Interface
- Equipment Check Out
- Mobile iOS
- Mobile Android
- Respond Web App
- Storeroom (Water and Sewer uses all four Storeroom licenses for the management of their warehouse inventory. Based on EA's review, Storeroom will not be necessary for triennial maintenance inspections.)

<u>Recommendation for Next Steps:</u>

- Investigate potential cost share for the annual Cityworks license between Water and Sewer and Construction Management.

4.2 County-Maintained Cityworks Server Environment

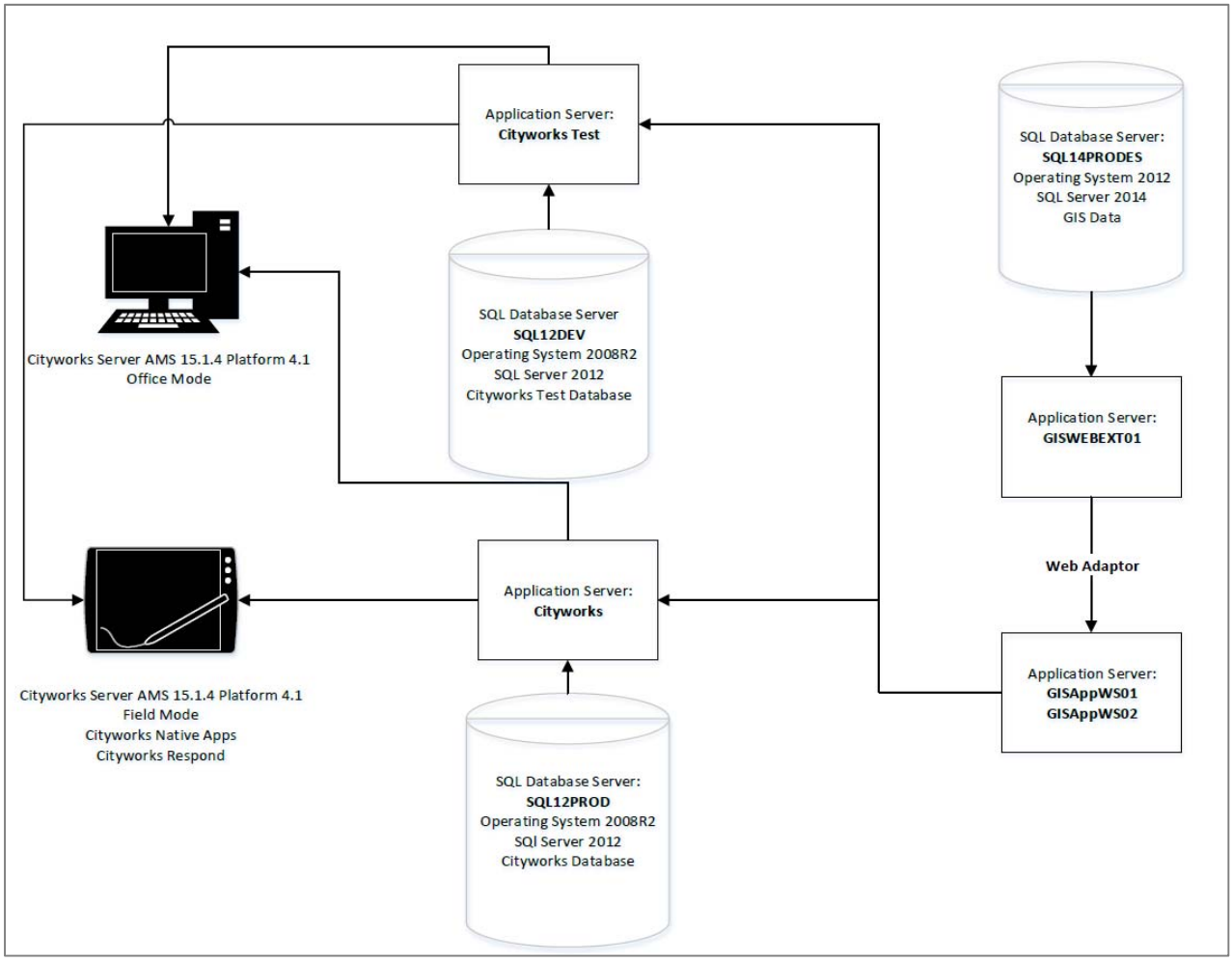
OICT maintains the Cityworks server environment used by Water and Sewer. The environments are set up on virtual servers and includes a production environment and a test environment.

The production environment is used for daily asset management. The production environment is an external application server and can be accessed remotely on mobile devices. The test environment is a mirror image of the production environment available for testing configuration

changes and other modifications prior to "Going Live" for daily asset management. The test environment is currently an internal application server that requires a VPN on mobile devices.

OICT has set up Cityworks to use an SQL database server to host the Cityworks database and an application server to host the Cityworks software. See Figure 7 for a schematic of the current Cityworks server environment.

Figure 7: Cityworks Server Setup by OICT



Cityworks Test is an internal application server that has an instance of Cityworks Server AMS 15.1.4 Platform 4.1 software installed. **Cityworks Test** is used to configure, update, and test the Cityworks site before going to production.

SQL12DEV is an internal database server that stores the Cityworks database for the test environment. The server's operating system is 2008R2 and the SQL Server is 2012. **SQL12DEV** is connected to **Cityworks Test** application server to produce Cityworks test environment.

Cityworks is an external application server that has an instance of Cityworks Sever AMS 15.1.4 Platform 4.1 software installed. **Cityworks** application server is the production server that Water and Sewer uses to record their daily asset management.

SQL12PROD is an external database server that stores the Cityworks database for Water and Sewer's daily asset management effort. The server's operating system is 2008R2 and the SQL Server is 2012. **SQL12PROD** is connected to **Cityworks** application server to create the Cityworks production environment.

OICT's server setup for the test environment and production environment could be used to expand the use of Cityworks for triennial maintenance inspections.

Recommendations for Next Steps:

- Investigate the need to externalize the test environment to pilot the triennial maintenance inspections. Requiring inspectors to use a VPN for a pilot would not provide an accurate experience for using the software. This could create an obstacle for user testing and acceptance.
- Investigate the costs for cellular mobile devices for triennial maintenance inspectors.
- Determine workflow and access needs for EA to configure Cityworks for triennial maintenance inspections.

4.3 Water and Sewer Cityworks Configuration

All Water and Sewer Cityworks users work within a single Cityworks domain in the SQL12PROD database server. A domain in Cityworks is a distinct group of users that share work activities and resources. In Cityworks, work activities are inspections, work orders, and service requests. Based on discussions with Water and Sewer and Construction Management, it is unlikely there will be any overlap in users, work activities, or resources. Therefore, a separate domain should be created for stormwater management assets.

4.4 County-Maintained ESRI Software and Server Environment for Cityworks

The County uses the following ESRI products:

- ArcGIS Server 10.6
- ArcSDE
- ArcGIS Desktop 10.5
- ArcGIS Enterprise
- ArcGIS Pro 2.0.1.

Water and Sewer currently has four ArcGIS Servers that store and publish the GIS data consumed by Cityworks (Figure 7). Water and Sewer has divided the GIS data into the four map services: Base Map, Water Plant, Utilities (horizontal assets), and Administration. Water and Sewer have also set up a geocoder service for use in Cityworks.

SQL14PRODES is an internal database server that has an instance of ArcSDE installed and is connected to **GISWEBEX101** through a SQL server client. This server stores the Water and Sewer GIS data.

GISWEBEX101 is an internal application server that has an instance of ArcGIS Server 10.6. This server stores the map services (similar to an MXD in ArcDesktop) that references the GIS data on **SQL14PRODES**. The map services is where the GIS data are symbolized to be published as a service and then consumed by Cityworks.

Web Adaptor: The web adaptor is an ArcGIS server component used to securely externalize the map services stored on **GISWEBEX101**.

GISAPPWS01 is an external sever that makes the map services on **GISWEBEX101** public.

GISAPPWS02 is a clone of **GISAPPWS01**. The purpose is to ensure that map services are available at all times.

OICT's server setup for the ESRI Server Environment could be used to expand the use of Cityworks for triennial maintenance inspections.

Recommendations for Next Steps:

- Review Water and Sewer's Base Map Service to determine the applicability of using this data for triennial maintenance inspections.

- Consider using Water and Sewer's Geocoder Service for consistent address location identification.

5. Conclusion

Based on the information from the County, there are several items that need to be reviewed and addressed prior to Cityworks implementation. The following is a brief summary of steps to implement Cityworks for the triennial maintenance inspection (some of these steps can happened concurrently):

1) Create a BMP Geodatabase schema (see Section 3) that includes the fields identified in Table 2.
2) Reconcile the fields in BMP_Final feature classes such as BMP Site Name, locations and create descriptions to be used in Inspection Form Headers between the Bureau of Stormwater Management and WP&R.
3) Populate the BMP Geodatabase.
4) Draft and discuss several inspection templates in Cityworks to finalize inspection templates to be used for triennial maintenance inspection.
5) Finalize Inspection Rating for setting up triggers in Cityworks for re-inspection or notification of acceptable inspection for MS4 reporting.
6) Create map services of BMP Geodatabase to be consumed in Cityworks.
7) Coordinate with OICT to host map services to be consumed in Cityworks.
8) Configure Cityworks for triennial maintenance inspection in Test Environment, and coordinate with OICT on making Test Environment externalized.
9) Train on Cityworks. Training needs to include attaching photographs and including red line drawings. Training should be done using both tablet and desktop interfaces to complete the inspections.
10) Allow end-user to test Cityworks configuration in a Test Environment.
11) Address end-user test comments and reconfigure if necessary.
12) Move Cityworks Configuration from Test Environment to Production Environment; once again coordinate with OICT on this effort.
13) Provide Go Live support for end-users as they include Cityworks in their everyday workflow.

Appendix A – Summary of Conclusions and Recommendations

Section	Conclusion	Recommendation
4.1 Existing Cityworks Software Licenses	Construction Management will require licenses for the AMS Edit+ Standard and Mobile iOS and/or Mobile Android to meet their objective. Water and Sewer's existing license agreement with Azteca provides sufficient assets to meet Construction Management objective.	Water and Sewer pay the full cost of Cityworks. The staff involved in the discussions on the Cityworks software were not the ones who would decide on an internal County payment schedule for Construction Management to use Cityworks. As this opportunity develops, it is recommended that the County identify and engage those individuals involved in a cost-sharing discussion.
4.2 County-Maintained Cityworks Server Environment	OICT's server setup for the test environment and production environment is sufficient to meet Construction Management's objective.	The Test Environment is an internal application server. In order for end-users to test the application, they would need VPN access from the field, which would create one more obstacle in end-user testing and acceptance of the Cityworks configurations. To ease the end-user experience and improve the likelihood of user acceptance of the new software/workflow, EA recommends that the Test Environment be externalized.
4.3 Water and Sewer Cityworks Configuration		EA recommends Construction Management create a separate domain for the triennial maintenance inspections. This domain could grow into other stormwater management objectives.
4.4 County-Maintained ESRI Software and Server Environment for Cityworks	OICT's server setup for the ESRI Server Environment is sufficient for Construction Management objective.	Construction Management should review the Base Map Service from Water and Sewer to determine if that Base Map will suffice for their use. EA recommends Construction Management use the same Geocoder Service as Water and Sewer to keep consistency throughout Harford County.

Appendix B – BMP Feature Class Review

BMP_poly attribute table – polygon geometry - 66 entities in feature class

Attribute	ESRI Data Type	Description/Notes	Data Populations	Further Discussion
BMP_ID	Text	Matches MDE Geodatabase Guidance May 2017. BMP ID name is HA17BMP####### (6 digit number after)	14 Null values	
LOCAL_BMP_ID	Text	Matches MDE Geodatabase Guidance May 2017. BMP ID format various and is likely the link to historic BMP	All entities populated	
BMP_DRAIN_ID	Text	Matches MDE Geodatabase Guidance May 2017.	All value are NULL	
BMPPOI_ID	Text	Matches MDE Geodatabase Guidance May 2017, Populated for 8 entities. BMP_DRAIN_ID is HA17POI#######, the last six digits does not match the BMP_ID	58 NULL values	
BMP_DRAIN_AREA	Double	Matches MDE Geodatabase Guidance May 2017.	All values are NULL	
BMP_NAME	Text	Matches MDE Geodatabase Guidance May 2017. Name is based on locations name.	14 Null Values – same 14 as the BMP_ID	**Further discussion with Construction Management on whether Name matches Permit Name for BMP Triennial Inspection reporting.**

Attribute	ESRI Data Type	Description/Notes	Data Populations	Further Discussion
BMP_CLASS	Text	Matches MDE Geodatabase Guidance May 2017 but missing domain. All values would match MDE Geodatabase dBMPCLASS domain list.	14 NULL Values – same 14 as the BMP_ID	
BMP_TYPE	Text	Matches MDE Geodatabase Guidance May 2017 but missing domain. All values would match MDE Geodatabase dBMPType domain list	14 NULL Values – same 14 as the BMP_ID	
BMP_STATUS	Text	Matches MDE Geodatabase Guidance May 2017 but missing domain. All values would match MDE Geodatabase dBMPStatus domain list	14 NULL Values – same 14 as the BMP_ID	
NUM_BMPS	Short Integer	Matches MDE Geodatabase Guidance May 2017. Number of BMPs of similar BMPClass, BMPType and BMPStatus at the site.	14 NULL Values – same 14 as the BMP_ID	
ADDRESS	Text	Matches MDE Geodatabase Guidance May 2017. Mailing location of BMP	14 NULL Values – same 14 as the BMP_ID	
CITY	Text	Matches MDE Geodatabase Guidance May 2017. Mailing city of location.	14 NULL Values – same 14 as the BMP_ID	

Attribute	ESRI Data Type	Description/Notes	Data Populations	Further Discussion
STATE	Text	Matches MDE Geodatabase Guidance May 2017 but missing domain. All entities would be in Maryland	14 NULL Values – same 14 as the BMP_ID	
ZIP	Text	Matches MDE Geodatabase Guidance May 2017. Mailing zip code of BMP		
ON_OFF_SITE	Text	Matches MDE Geodatabase Guidance May 2017 but missing domain. Field is Optional.	All values NULL, Harford County prefers not to populate Optional fields	
CON_PURPOSE	Text	Matches MDE Geodatabase Guidance May 2017 but missing domain. Values would match MDE Geodatabase dConPurpose domain	19 NULL Values	
BUILT_DATE	Date	Matches MDE Geodatabase Guidance May 2017. As-built completion date.	14 NULL Values - same 14 as the BMP_ID	**Further discussion with Construction Management on whether the As-Built completion date is the same date as bond release date for Engineering Plan projects.**
PERMIT_NUM	Text	Matches MDE Geodatabase Guidance May 2017. This is the County MDE Permit Number: 11-DP-3310	All Values populated.	
GEN_COMMENTS	Text	Matches MDE Geodatabase Guidance May 2017. Field is Optional	63 NULL Values, Harford County prefers not to populated Optional fields	

Attribute	ESRI Data Type	Description/Notes	Data Populations	Further Discussion
Shape_Length	Double			
Shape_Area	Double			
SWMasBuilts	Text	Additional field used by the County for hyperlink to as-built plans.	Only 1 entity populated.	

NEW_BMP_2014 – point geometry - 207 Entities

Attribute	ESRI Data Type	Description/Notes	Data Populations	Further Discussion
BMP_ID	Text	Matches MDE Geodatabase Guidance May 2017. BMP ID name is HA17BMP####### (6 digit number after)	All entities populated	
LOCAL_BMP_ID	Text	Matches MDE Geodatabase Guidance May 2017. BMP ID format various and is likely the link to historic BMP	All entities populated	

Attribute	ESRI Data Type	Description/Notes	Data Populations	Further Discussion
BMP_DRAIN_ID	Text	Matches MDE Geodatabase Guidance May 2017. BMP_DRAIN_ID isHA15BDA#######, the last six digits does not match the BMP_ID or LOCAL_BMP_ID numbers.	All entities populated	
BMPPOI_ID	Text	Matches MDE Geodatabase Guidance May 2017. BMP_POI_ID is HA17POI#######, the last six digits does not match the BMP_ID	All entities populated	
BMP_DRAIN_AREA	Double	Matches MDE Geodatabase Guidance May 2017.	206 entities populated. One site has a DA of 0.	
BMP_NAME	Text	Matches MDE Geodatabase Guidance May 2017. Name is based on locations name.	All entities populated	
BMP_CLASS	Text	Matches MDE Geodatabase Guidance May 2017 but missing domain. All values would match MDE Geodatabase dBMPCLASS domain code list.	All entities populated	

Attribute	ESRI Data Type	Description/Notes	Data Populations	Further Discussion
BMP_TYPE	Text	Matches MDE Geodatabase Guidance May 2017 but missing domain. All values would match MDE Geodatabase dBMPType domain code list	All entities populated	
BMP_STATUS	Text	Matches MDE Geodatabase Guidance May 2017 but missing domain. All values do not match MDE Geodatabase dBMPStatus domain code list.	All entities populated	**Need to revise values to match domain code list.**

Attribute	ESRI Data Type	Description/Notes	Data Populations	Further Discussion
NUM_BMPS	Short Integer	Matches MDE Geodatabase Guidance May 2017. Number of BMPs of similar BMPClass, BMPType and BMPStatus at the site	All entities populated	**Data are not consistent. Some site are repeated multiple times even though the same BMPClass, BMPType and BMPStatus are present. Further discussion with WP&R is needed to decide if BMPs should be grouped together. EA estimates 18 sites may have BMPs that can be combined because they are the same BMPClass, BMPType, BMPStatus and may discharge to the same BMPPOI. (e.g., Schucks Rd Regional Sports Complex, Youth LLC Lots 1-4, Churchville Library/Activity Center + Rec Complex, Ally's Meadow, Clayton Rd - 1402 Grose Property, Nature's and several more).**
ADDRESS	Text	Matches MDE Geodatabase Guidance May 2017. Mailing location of BMP.	All entities populated	
CITY	Text	Matches MDE Geodatabase Guidance May 2017. Mailing city of location.	All entities populated	
STATE	Text	Matches MDE Geodatabase Guidance May 2017 but missing domain. All entities would be in Maryland.	All entities populated	

Attribute	ESRI Data Type	Description/Notes	Data Populations	Further Discussion
ZIP	Text	Matches MDE Geodatabase Guidance May 2017. Mailing zip code of BMP.	All entities populated	
ON_OFF_SITE	Text	Matches MDE Geodatabase Guidance May 2017 but missing domain. All values would match MDE Geodatabase dON_OFFSite domain code list	All entities populated	
CON_PURPOSE	Text	Matches MDE Geodatabase Guidance May 2017 but missing domain. Values would match MDE Geodatabase dConPurpose domain	All entities populated	
BUILT_DATE	Date	Matches MDE Geodatabase Guidance May 2017.	All entities populated	**As-built completion date. Further discussion with Construction Management on whether the As-Built completion date is the same date as bond release date for Engineering Plan projects.**
PERMIT_NUM	Text	Matches MDE Geodatabase Guidance May 2017.	All Values populated	**Further discussion needed on what Permit Number is being referenced.**
GEN_COMMENTS	Text	Matches MDE Geodatabase Guidance May 2017.	All entities populated	**Father discussion need on what data are populated here. Appears to be a Permit Number.**

Fac*ilities attribute table – point geometry- 1005 entities*

Attribute	ESRI Data Type	Description/Notes	Data Population	Further Discussion
OBJECTID	Long Integer	Numerical value	106 NULL Values	**Further discussion with Construction Management on intent of this field**
QC20160703	Short Integer	Values 0 or 1	All populated	**Further discussion with the Construction Management on intent of attribute**
Notes20160730	Text	Notes on Water Quality calculations.	930 NULL Values	
WQ	Short Integer	Values 0 or 1	All populated	**Further discussion with the Construction Management on intent of attribute**
feature	Text	Numbering system of BMPs. Numbered sequentially based on entry into the database. Feature is SWM#### or SWM#######.	43 NULL Values	
SiteMapLink	Text	File Path to photo on C. Buckley Desktop	1003 NULL Values	
north	Long Integer	Latitude	56 NULL Values	**Further discussion with Construction Management on whether this location is the centroid of BMP, inflow into BMP, or outflow from BMP.**
east	Long Integer	Longitude	56 NULL Values	**Further discussion with Construction Management on whether this location is the centroid of BMP, inflow into BMP or outflow from BMP.**
source_doc	Text	Numerical reference to individual plan sheets being scanned and maintained in Records Management Database by Doug Klein	324 NULL Values	

Attribute	ESRI Data Type	Description/Notes	Data Population	Further Discussion
input_date	date	Date of Input?	515 NULL Values	**Further discussion with Construction Management on whether this date is the date is the feature is added to the geodatabase, or another date.**
input_meth	text	Method to add BMP to geodatabase. Include Georef (georeferenced plan), GPS (taking a GPS location), Onscreen (using aerial image to identify BMP), OS-DIGI (?) or Rectified (?)	523 NULL Values	**Further discussion with Construction Management on the methods identified.**
project_no	text	5 digit project number that is issued by Permitting.	719 NULL Values	**Further discussion with Construction Management on which specific permit number is being recorded.**
site	text	Combination of Site Name and Site Addresses.	28 NULL Values	**Further discussion with Construction Management on whether this Site Name matches the Project Name used by the Inspectors.**
aka	text	Historic name of site.	867 NULL Values	
address	text	Combination of description and address of site. .	51 NULL Values	**Further discussion with Construction Management on whether the address matches the address used by the Inspectors**
city	text	City BMP is located in	49 NULL Values	
zip	text	Zip BMP is located in	49 NULL Values	
plan_app	date	Plan approval date.	112 NULL Values	**Further discussion on whether this date is the approval date from permitting for the issuing the permit**
permit_app	date	Permit approval date.	218 NULL Values	**Further discussion on whether this date is the as-built date, or the start of construction date**

Attribute	ESRI Data Type	Description/Notes	Data Population	Further Discussion
permit_num	text	Permit Number in format from Permitting. TwoDigitiYear-PRojectNumber-FacilitiyID Number.	74 NULL Values	
landuse	text	Two digit land use value.	85 NULL Values	**Further discussion on what land use index is being used.**
swm_acreage	float	Drainage Area in acres to BMP.	113 NULL Values	
IMPacres	float	Impervious Area drainage area in acres to BMP	948 NULL Values	
rcn	Long Integer	Run Off Curve Number to BMP	115 NULL Values	
type	Text	Two Digit BMP type.	92 NULL Values	
completion	date	Completion date of construction?	108 NULL Values	**Further discussion on completion date.**
as_built	date	As-Built date of plans.	178 NULL Values	
YearAsBuilt	Text	4 digit year of As-Built Plans	187 NULL Values	
AsBuiltNotes	Text	QAQC Notes on As-Builts	972 NULL Values	
watershed	Text	1 to 3 digits numbers indicating watershed.	176 NULL Values	**Further discussion on what watershed is being referenced.**
last_update	date	Tracking of updated completed during 2012-2014.	58 NULL Values	
notes	Text	Assume notes are from updated completed during 2012-2014.	783 NULL values	**Verification from Construction Management needed.**
ADC_mapbook	Text	Combination of ##A## and 6 digit number, likely referencing multiple years of ADC Books.	161 NULL Values	
New_ADC	Text	Combination of ##A## and 6 digit number, likely	819 NULL Values	

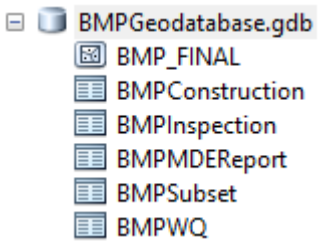
Attribute	ESRI Data Type	Description/Notes	Data Population	Further Discussion
		referencing multiple years of ADC Books.		
on_off_site	Text	Matches MDE Geodatabase Guidance May 2017 but missing domain.	291 NULL Values	
total_drain	float	Drainage Area?	334 NULL Values	**Assumed total drainage area to BMP but values do not match swm_acreaage. Further discussion on difference between total_drain and swm_acreage.**
proj_type	Text	Original, repair, retrofit, expansion to indicate the BMP	281 NULL Values	
checked	Text	Tracking checks performed on the feature class at some point	751 NULL Values	
DNR12digit	Text	12 digit watershed number	47 NULL Values	
temp	Short Integer	Values 0 or 1 – unclear on purpose.	10 NULL Values	**Further discussion with Construction Management required**
QA	Text	Tracking QA performed on the feature class at some point	923 NULL Values	
Era	Text	Unclear on intent of attribute.	71 NULL Values	**Further discussion with Construction Management required**
current_record	Text	Values Yes or No - as reference to project type if the practice has been altered and which feature to reference as current.	48 NULL Values	
Georeference	Text	Identifies method of georeferenced, if coordinate or heads up digitized from aerial images.	974 NULL Values	

Attribute	ESRI Data Type	Description/Notes	Data Population	Further Discussion
ESD_onsite	Text	Values Yes or No as reference to ESD being onsite of for drainage area being treated.	980 NULL Values	**Further discussion with Construction Management required**
CPV_REQ	float		994 NULL Values	
CPV_PROV	float		995 NULL Values	
WQV_REQ	Float	Water Quality volume	994 NULL Values	
REV_REQ	float		994 NULL Values	
REV_PROV	float		994 NULL Values	
WQV_PROV	float		748 NULL Values	
ESD_REQ	float		1000 NULL Values	
ESD_PROV	float		1000 NULL Values	
DA_source	Text	Numerical reference – unclear on what this attribute is reference.	750 NULL Values	**Further discussion with Construction Management required**
app_source	Text	Numerical reference – unclear on what this attribute is reference.	761 NULL Values	**Further discussion with Construction Management required**
SWM_link	Text	Hyperlink to Laserfiche for the plans of the BMP	775 NULL Values	
plan_sheet	Text	Numerical reference – unclear on what this attribute is reference.	972 NULL Values	**Further discussion with Construction Management required**
Tax_ID	Text	Numerical reference – unclear on what this attribute is reference in regards to Tax_ID.	100 NULL Values	**Further discussion with Construction Management required**
checked_notes	Text	Tracking QA performed on the feature class at some point	993 NULL Values	
status	Text	Tracking status of BMP at some point	758 NULL Values	

Attribute	ESRI Data Type	Description/Notes	Data Population	Further Discussion
ownership	Text	Tracking ownership by County or Private	15 NULL Values	
SWMplan_link	Text	Appears to be repeat of SWM_Link	1003 NULL Values	
YearBuiltActual	Short Integer	Values 0 or 1 – unclear on purpose.	All Values Populated	**Further discussion with Construction Management required**
YearBuilt	Short Integer	Four digit year value.	78 NULL Values	**Further discussion with Construction Management required**
YearBuiltNotes	Text		984 NULL Values	**Further discussion with Construction Management required**
Jordan	Text	Column to track intern edits	945 NULL Values	

Appendix C – Draft Schema for Stormwater Management Polygon Features

BMP Geodatabase – Example Potential Database Schema – April 26, 2018



BMPConstruction-RelatedTable		
Attribute	Description	Source
BMP_ID	Unique BMP ID - can be the MDE or Local BMP ID	To be discussed based on GIS information or Energov information
Permit	Permit Number from Permitting	Energov
Plan_Appr	Date of Permit Approval from County	
Permit_Appr	Date of Permit Approval from the County	
AsBuilt	Date of Asbuilt	
Built_Date		
CON_PURSPOSE	MDE required – New development of redevelopment of site	
Additional Fields as Needed…		

BMPMDEReport-RelatedTable		
Attribute	Description	Source
BMP_ID	Unique BMP ID - can be the MDE or Local BMP ID	To be discussed based on GIS information or Energov information
Land_Use	Predominant land use	Energov
LU_County	County unique land user (predominant)	
Watershed8DGT	Maryland 8 digit hydrologic unit code	
Watershed12DGT	USGS 12 digit hydrologic unit code	
BMPAdd	BMP Address	
BMPCity	BMP City	
BMPState	BMP State	
BMPZip	BMP Zip Code	
ON_OFF_Site	On or off site BMP	
Additional Fields as Needed….		

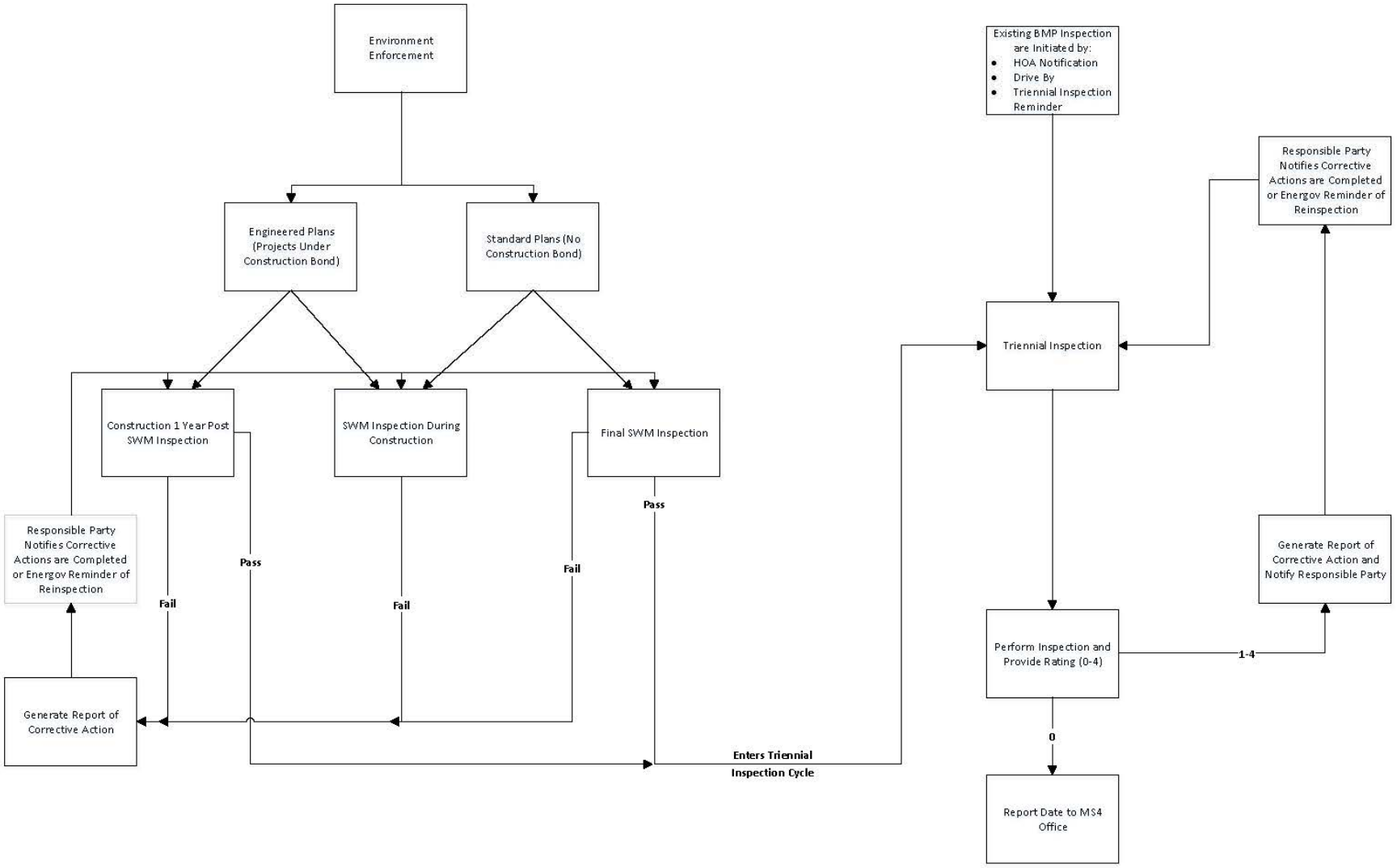
BMPWQ-RelatedTable		
Attribute	Description	Source
BMP_ID	Unquie BMP ID - can be the MDE or Local BMP ID	To be discussed based on GIS information or Energov information
DA	Drainage Area to BMP	
DAImp_Area	Drainage Area of Impervious surface to the site	
RCN_Pre	Runoff Curve Number before event	
RCN_Post	Runoff Curve Number after event	
RCN_Woods	Runoff Curve Number, woods	
PE_REQ	PE required	
PE_ADR	PE addressed	
Q_PRE	Runoff before constrinction in inches	
Q_POST	Runoff after construction in ineches	
Q_Woods	Runoff, woods in inches	
Additional Fields as Needed…		

BMP_FINAL – Geometry Polygon – Needed In Cityworks		
Attribute	Description	Source
BMP_ID	Unquie BMP ID - can be the MDE or Local BMP ID	To be discussed based on GIS information or Energov information
BMP_Type	Using domain table from MDE Guidance May 2017	StormwaterNEW.mdb feature Class BMP_poly for 66 sites
NUM_BMP	Number of BMPs present	
PermitID	Using County Construction Permit System	Energov
Plan_Hyperlink	Laserfiche location	StormwaterNEW.mdb feature Class BMP_poly for 66 sites
Outfall_Lat	Latitude of outfall location - this will assist in transferring the data to the BMP_POI (MD_North)	StormwaterNEW.mdb Feature Class BMP_POI. Needs to be created for 1300+ sites
Outfall_Long	Longitude of outfall location - this will assist in transferring the data to the BMP_POI (MD_East)	StormwaterNEW.mdb Feature Class BMP_POI. Needs to be created for 1300+ sites
Location	Description of location of BMP at site, or identification of grouping of BMPs	Needs to be created between Inspector and WR&P.
Own_Name	Owner who owns BMPs	Energov
Own_Address	Owner address	
Own_City	Owner City	
Own_State	Owner State	
Own_Zip	Owner Zip	
Manag_Name	Management company who maintains BMPs	
Manag_Address	Management address	
Manag_City	management city	
Manag_State	management state	
Manag_Zip	management zip	
Additional Fields as Needed….		

BMPSubset-RelatedTable – Needed in Cityworks		
Attribute	Description	Source
BMP_ID	Unique BMP ID - can be the MDE or Local BMP ID	To be discussed based on GIS information or Energov information
Permit	Permit Number from Permitting	Energov
BMP Type	Using MDE Domain	
BMP Status	Using MDE Domain	
BMP Class	Using MDE Domain	
Location	Description of BMP	
Additional Fields as Needed….		

BMPInspection-RelatedTable – Needed in Cityworks		
Attribute	Description	Source
BMP_ID	Unquie BMP ID - can be the MDE or Local BMP ID	To be discussed based on GIS information or Energov information
DateInspect	Date of Inspection	Cityworks
Inspector	Name of Inspector preforming inspections	Cityworks
Rating	Rating of result of inspection 0-4	Cityworks
Additional Fields as Needed….		

Appendix D – Current Triennial Maintenance Inspection Workflow


Environment Enforcement
Engineered Plans (Projects Under Construction Bond)
Standard Plans (No Construction Bond)
Construction 1 Year Post SWM Inspection
SWM Inspection During Construction
Final SWM Inspection
Responsible Party Notifies Corrective Actions are Completed or Energov Reminder of Reinspection
Generate Report of Corrective Action
Fail
Pass
Fail
Fail
Pass
Enters Triennial Inspection Cycle
Existing BMP Inspection are Initiated by:
HOA Notification
Drive By
Triennial Inspection Reminder
Triennial Inspection
Perform Inspection and Provide Rating (0-4)
1-4
0
Report Date to MS4 Office
Generate Report of Corrective Action and Notify Responsible Party
Responsible Party Notifies Corrective Actions are Completed or Energov Reminder of Reinspection

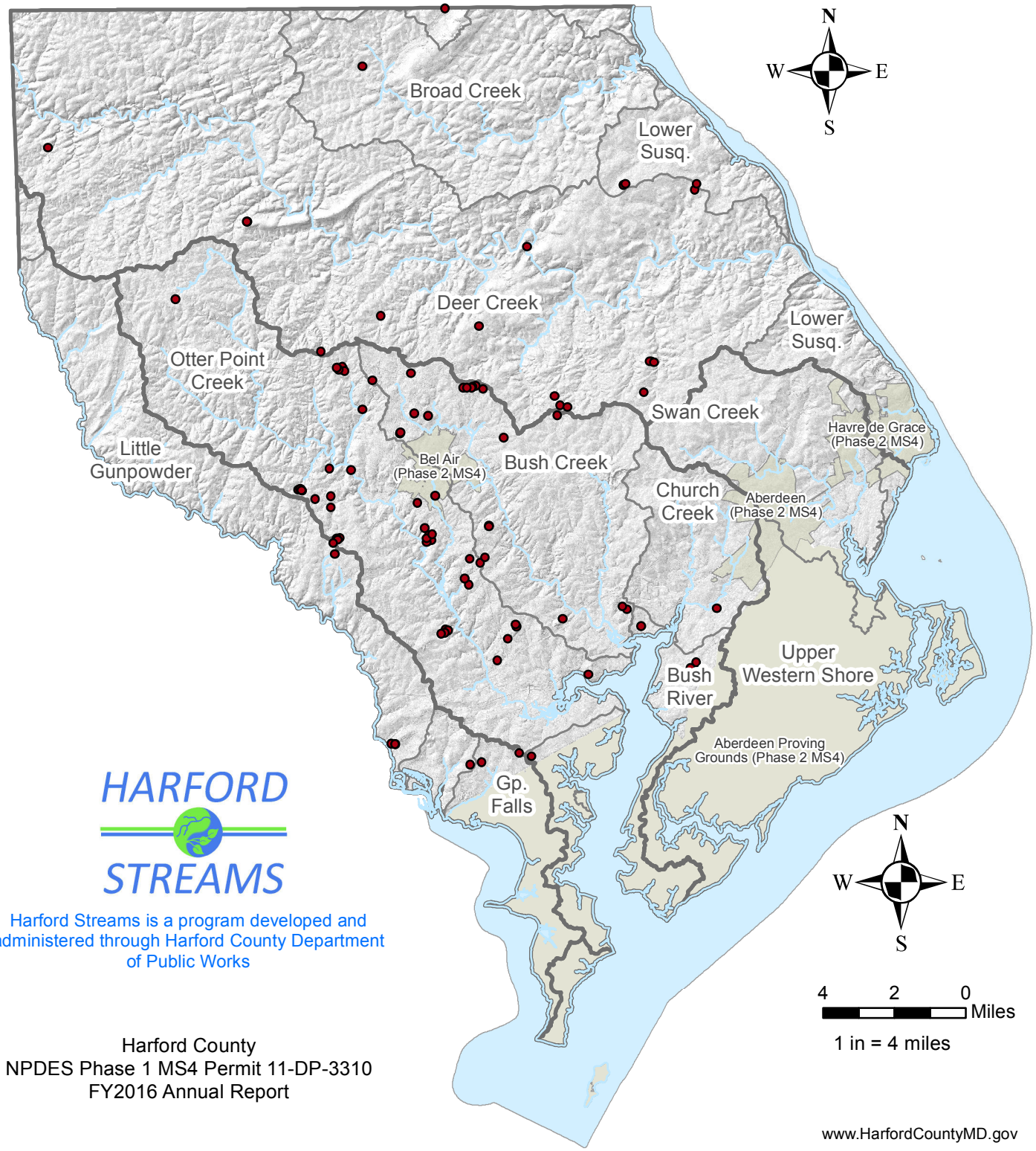
Stormwater Management Facilities

Appendix C3

Harford County, MD Department of Public Works
Watershed Protection and Restoration

Stormwater As-builts (July 1, 2017 - June 30, 2018)

Barry Glassman
County Executive



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Harford County, MD Department of Public Works

Watershed Protection and Restoration

Stormwater Management Projects Asbuilt during Fiscal Year 2018 (MS4 Permit 11-DP-3310)

Barry Glassman
County Executive

Project Name	As-built	MDE BMP ID	BMP Type
Anita C. Leight Estuary Center Parking Lot & SWM Retrofit	01/30/18	HA18RST000002	Micro-Bioretention
		HA18RST000001	Permeable Pavements
Anns Meadow - Final As-Built	10/27/17	HA18BMP010119	Detention Structure (Dry Pond)
		HA18BMP010116	Sand Filter
		HA18BMP010117	Submerged Gravel Wetlands
		HA18BMP010120	Rain Gardens
Belle Manor Pond Repair	10/11/17	HA18BMP000240	Detention Structure (Dry Pond)
BGE - Bagley to Graceton 230KV Transmission Line Rebuild	12/11/17	HA18BMP010197	Disconnection of Non-Rooftop Runoff
		HA18BMP010202	Reinforced Turf
		HA18BMP010203	Reinforced Turf
		HA18BMP010201	Other
		HA18BMP010204	Other
BGE - Graceton Substation	12/29/17	HA18BMP010243	Submerged Gravel Wetlands
Cardiff Intergrated Shopping Center Pond Repair	10/11/17	HA18BMP010085	Detention Structure (Dry Pond)
Church Creek Elementary Playground Rehab	10/10/17	HA18BMP010086	Micro-Bioretention
Churchville Complex Expansion Phase 2	08/25/17	HA18BMP010084	Micro-Bioretention

Colvard Choice Pond 2 Final As-Built	04/04/18	HA18BMP010121	Shallow Marsh
Country Walk Facility 1B SWM Retrofit	07/27/17	HA18RST000003	Pocket Wetland
Darlington Park Improvements	10/30/17	HA18BMP010070	Bio-Swale
		HA18BMP010213	Bio-Swale
		HA18BMP010212	Micro-Bioretention
		HA18BMP010069	Submerged Gravel Wetlands
Deer Creek Kayak Launch - 3010 Conowingo Road	01/31/18	HA18BMP010259	Rain Gardens
		HA18BMP010260	Other
		HA18BMP010261	Disconnection of Non-Rooftop Runoff
		HA18BMP010262	Disconnection of Non-Rooftop Runoff
		HA18BMP010263	Disconnection of Non-Rooftop Runoff
		HA18BMP010264	Disconnection of Non-Rooftop Runoff
Emmorton Elementary Pond Repair	11/09/17	HA18BMP000141	Extended Detention Structure, Wet
Fallston High School Synthetic Field	12/11/17	HA18BMP010093	Other
		HA18BMP010229	Other
Fallston Mead Lots 2 & 5	11/03/17	HA18BMP010228	Dry Well
		HA18BMP010074	Grass Swale
		HA18BMP010118	Grass Swale
		HA18BMP010216	Grass Swale
		HA18BMP010224	Dry Well
		HA18BMP010227	Dry Well
Forest Lakes Section 6 Pond Repair	01/02/18	HA18BMP000161	Extended Detention Structure, Dry
HCC - Right Turn Lane Rte 22 @ Thomas Run Road	01/25/18	HA18BMP010089	Bio-Swale

HCC - Slipline Pond Repair	10/10/17	HA18BMP000542	Extended Detention Structure, Wet
		HA18BMP010217	Extended Detention Structure, Dry
HCC - Susquehanna Center Addition & Renovation	09/25/17	HA18BMP010091	Extended Detention Structure, Dry
		HA18BMP010092	Extended Detention Structure, Wet
Harford Dale South	11/01/17	HA18BMP010268	Micro-Bioretention
		HA18BMP010267	Extended Detention Structure, Dry
		HA18BMP010266	Dry Well
		HA18BMP010265-	Dry Well
Harford Senior Housing Pond Repair Final As-Built	10/05/17	HA18BMP000915	Extended Detention Structure, Dry
Henderson Manor Pond Repair	12/18/17	HA18SWM000543	Extended Detention Structure, Dry
Hess Property	01/25/18	HA18BMP010225	Dry Well
		HA18BMP010226	Dry Well
		HA18BMP010072	Grass Swale
		HA18BMP010073	Grass Swale
		HA18BMP010080	Grass Swale
Hopewell Farms Distribution Center	02/27/18	HA18BMP010098	Extended Detention Structure, Dry
		HA18BMP010096	Extended Detention Structure, Wet
		HA18BMP010097	Extended Detention Structure, Wet
		HA18BMP010250	Grass Swale
		HA18BMP010251	Grass Swale
		HA18BMP010252	Grass Swale
		HA18BMP010253	Grass Swale
		HA18BMP010254	Grass Swale

		HA18BMP010255	Grass Swale
		HA18BMP010256	Grass Swale
		HA18BMP010214	Permeable Pavements
		HA18BMP010218	Grass Swale
		HA18BMP010219	Micro-Bioretention
		HA18BMP010231	Micro-Bioretention
		HA18BMP010230	Submerged Gravel Wetlands
Humane Society Of Harford County	11/14/17	HA18BMP010100	Grass Swale
		HA18BMP010099	Submerged Gravel Wetlands
		HA18BMP010101	Micro-Bioretention
		HA18BMP010102	Micro-Bioretention
Jacobs Pond Lots 3 & 4	08/04/17	HA18BMP010232	Dry Well
		HA18BMP010233	Dry Well
		HA18BMP010105	Grass Swale
Jacobs Pond Lot 5	11/03/17	HA18BMP010234	Dry Well
Laurel Bush Rd Ext Pond Repair aka Bright Oaks Commercial	12/19/17	HA18BMP000123	Extended Detention Structure, Dry
Magness Overlook Ponds 4, 5, 6 & 7 - Final As-Built	10/31/17	HA18BMP010066	Detention Structure (Dry Pond)
		HA18BMP010067	Detention Structure (Dry Pond)
		HA18BMP010220	Disconnection of Non-Rooftop Runoff
		HA18BMP010221	Disconnection of Non-Rooftop Runoff
		HA18BMP010248	Disconnection of Non-Rooftop Runoff
		HA18BMP010245	Disconnection of Non-Rooftop Runoff
		HA18BMP010246	Disconnection of Non-Rooftop Runoff

		HA18BMP010247	Disconnection of Non-Rooftop Runoff
		HA18BMP010122	Dry Well
		HA18BMP010148	Dry Well
		HA18BMP010169	Dry Well
		HA18BMP010198	Dry Well
		HA18BMP010065	Extended Detention Structure, Wet
		HA18BMP010068	Extended Detention Structure, Wet
		HA18BMP010075	Micro-Bioretention
Old Emmorton Road 2214	10/26/17	HA18BMP010235	Micro-Bioretention
Perryman Industrial Park Lot 2 - Final As-Built	02/12/18	HA18BMP010106	Micro-Bioretention
		HA18BMP010236	Infiltration Basin
Prospect Green Bioswales 9 & 10	08/08/17	HA18BMP010109	Submerged Gravel Wetlands
Prospect Green Gravel Wetland #2	11/06/17	HA18BMP010239	Submerged Gravel Wetlands
		HA18BMP010240	Extended Detention Structure, Dry
Rogers Ford Pond 2 Only - A/B	08/15/17	HA18BMP010111	Extended Detention Structure, Wet
Rogers Ford Pond 3 Only - Final As-Built	10/30/17	HA18BMP01258	Extended Detention Structure, Wet
Rosier Residence Lot 32 808 Deep Ridge Road	01/31/18	HA18BMP010241	Dry Well
Starz Sports Academy & Training Center	11/01/17	HA18BMP010112	Micro-Bioretention
Trimble Fields Pond Repair Final As-Built	10/05/17	HA18BMP010113	Extended Detention Structure, Dry
Village of Bynum Run Section 1 Pond 2 Pond Repair	10/10/17	HA18BMP000287	Extended Detention Structure, Dry
Village Of Church Creek SWM Pond Repair	12/20/17	HA18BMP000835	Detention Structure (Dry Pond)
Wingate By Wyndham 1326 Policy Dr	09/22/17	HA18BMP010115	Permeable Pavements
Woolsey Heights Lot 6	10/24/17	HA18BMP010242	Dry Well

		HA18BMP010210	Grass Swale
		HA18BMP010211	Grass Swale

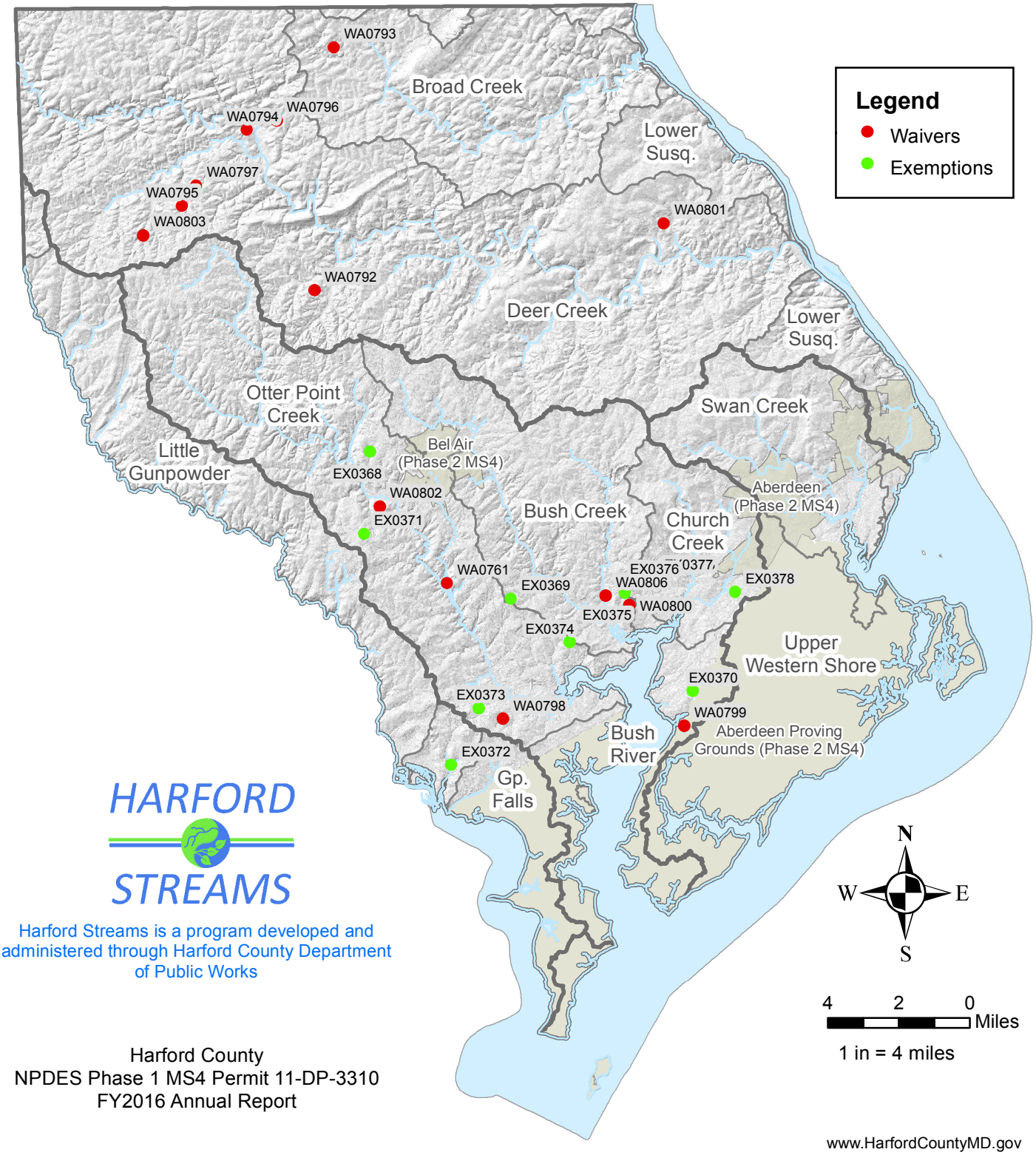
Stormwater Management Waiver, Exemptions, Fees in Lieu

Appendix C3

Harford County, MD Department of Public Works
Watershed Protection and Restoration

Barry Glassman
County Executive

Stormwater Approvals (July 1, 2017 - June 30, 2018)



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Harford County Stormwater Management Waivers between 7/1/2017 and 6/30/2018

site	location	submit date	approval date	watershed	easting	northing	quantity	quality	ID
ANNIE'S PLAYGROUND STREAM RESTORATION	864 SMITH LANE	3/23/2018	4/4/2018	021307031132	1487713	674514	W4	W4	WA0802
BELCAMP COMMERCIAL OFFSITE ROAD IMPROVEMENTS	MD RTE 7 AT BRASS MILL ROAD	5/3/2018	5/11/2018	021307011129	1528298	663895	W4	W4	WA0805
CHURCH CREEK ELEMENTARY SCHOOL STREAM RESTORATION	4299 CHURCH CREEK ROAD	3/7/2018	3/26/2018	021307011129	1524828	659845	W4	W4	WA0800
COLONIAL PIPELINE: LINE 3 DIG 1035	1924 POOLE ROAD	3/22/2018	4/4/2018	021202020322	1529975	716618	W5	W5	WA0801
COLUMBIA GAS - 2866 SHARON ROAD	2866 SHARON ROAD	9/12/2017	10/2/2017	021202020326	1477963	706704	W5	W5	WA0792
HARFORD COUNTY PUBLIC SCHOOLS - HARFORD GLEN GENERATOR	600 WEST WHEEL ROAD	7/25/2017	8/23/2017	021307031132	1497685	663109	W4	W4	WA0761
JAMES RUN OFFSITE WATER & SEWER CONTRACT NOS. 19636 & 19637	ALONG JAMES RUN	6/12/2018	6/21/2018	021307011129	1521274	661285	W5	W5	WA0806
SOD RUN WASTEWATER TREATMENT PLANT IMPROVEMENTS	1212 CHELSEA ROAD	11/30/2017	12/8/2017	021307011128	1532935	641951	W4	W4	WA0799
TRANSCONTINENTAL GAS PIPELINE, CLERMONT MILL ROAD	4602 CLERMONT MILL ROAD	9/21/2017	10/31/2017	021202020329	1472366	731989	W5	W5	WA0796
TRANSCONTINENTAL GAS PIPELINE, FAWN GROVE ROAD	4501 FAWN GROVE ROAD	9/21/2017	10/31/2017	021202020329	1467905	730516	W5	W5	WA0794
TRANSCONTINENTAL GAS PIPELINE, MOUNT HOREB ROAD	1919 MOUNT HOREB ROAD	9/21/2017	10/31/2017	021202020328	1460412	722258	W5	W5	WA0797

1 Waiver Types

W1	Less than 10% increase (1984 regulations)
W2	Completely surrounded by existing stormdrain (1984 regulation
W3	Provisions to control direct outfall to tidal water
W4	No increase in imperivous cover (2000 regulations)
W5	Underground Utilities (2000 regulations)

** 1984 regulations valid 9/1984 - 1/2002*
** 2000 regulations valid 2/2002 - present*

site	location	submit date	approval date	watershed	easting	northing	quantity	quality	ID
TRANSCONTINENTAL GAS PIPELINE, NELSON MILL ROAD	2123 NELSON MILL ROAD	9/21/2017	10/31/2017	021202020328	1458239	719250	W5	W5	WA0795
TRANSCONTINENTAL GAS PIPELINE, WHEELER SCHOOL ROAD	WHEELER SCHOOL ROAD	9/21/2017	10/31/2017	021202050343	1480866	742821	W5	W5	WA0793
VILLAGE OF LAKEVIEW SITE IMPROVEMENTS	833 FISHERMAN LANE	11/15/2017	12/6/2017	021307021130	1506026	642968	W4	W4	WA0798
WILLIAMS TRANSCONTINENTAL GAS PIPELINE, MP 1664 PIPELINE	TRIBUTARY OF CATTAIL BRANCH	3/20/2018	4/4/2018	021202020328	1452528	714877	W5	W5	WA0803

1 Waiver Types

W1	Less than 10% increase (1984 regulations)
W2	Completely surrounded by existing stormdrain (1984 regulation
W3	Provisions to control direct outfall to tidal water
W4	No increase in imperivous cover (2000 regulations)
W5	Underground Utilities (2000 regulations)

** 1984 regulations valid 9/1984 - 1/2002*
** 2000 regulations valid 2/2002 - present*

Appendix C3

Harford County Stormwater Management Exemptions between 7/1/2017 and 6/30/2018

site	location	submit date	approval date	watershed	easting	northing	type	ID
1809 CONNOLLY ROAD - CARTER CUSTOM KITCHENS	1809 CONNOLLY ROAD	8/31/2017	9/15/2017	021307031132	1485345	670462	E3	EX0371
821 RED PUMP ROAD	821 RED PUMP ROAD	8/17/2017	8/31/2017	021307031132	1486256	682663	E3	EX0368
BELCAMP COMMERCIAL OFFSITE ROAD IMPROVEMENTS	MD RTE 7 AT BRASS MILL ROAD	5/3/2018	5/11/2018	021307011129	1528463	663911	E3	EX0377
BOX HILL SOUTH SHOPPING CENTER	2915 EMMORTON ROAD	8/16/2017	9/13/2017	021307041131	1507187	660803	E3	EX0369
CLAYTON STATION BUSINESS CENTER - LOT 12 - ALDI EDGEWOOD EXPANSION	1312 BUSINESS CENTER WAY	10/30/2017	11/17/2017	021307021130	1502424	644553	E3	EX0373
CLOROX CHESAPEAKE BAY RESTORATION WATER QUALITY	1319 PERRYMAN ROAD	6/19/2018	6/27/2018	021307011129	1540567	661805	E3	EX0378
EASTGATE OFFSITE ROAD IMPROVEMENTS - MD 543 AT I-95 SB	MD 543 AT I-95 SB EXIT RAMP D	2/14/2018	3/6/2018	021307011129	1523396	663192	E3	EX0376
EASTGATE OFFSITE ROAD IMPROVEMENTS - MD 543 AT MD 7	MD 543 AT MD 7	2/14/2018	3/6/2018	021307011129	1524163	661715	E3	EX0375
MCCOMAS FUNERAL HOME	1317 COKESBURY ROAD	1/18/2018	2/1/2018	021307011127	1515956	654356	E3	EX0374
PERRYMAN GENERATOR TRANSFORMER	900 CHELSEA ROAD	9/11/2017	9/3/2017	021307011128	1534203	647114	E3	EX0370

1 Exemption Types

E1 Agricultural Land Management
E2 Additions or Modifications to single family residences
E3 Developments that disturb less than 5,000 SQ FT
E4 Land development regulated under State laws
E5 Single residences on lots greater than 2 acres (1984 regulations)*

** 1984 regulations valid 9/1984 - 1/2002*

site	location	submit date	approval date	watershed	easting	northing	type	ID
ROBERT COPENHAVER PARK ADA RESTROOM	664 TRIMBLE ROAD	9/28/2017	10/3/2017	021308010293	1498338	636049	E3	EX0372

[1] Exemption Types

E1	Agricultural Land Management
E2	Additions or Modifications to single family residences
E3	Developments that disturb less than 5,000 SQ FT
E4	Land development regulated under State laws
E5	Single residences on lots greater than 2 acres (1984 regulations)

** 1984 regulations valid 9/1984 - 1/2002*